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***Europe/International
Economic Competitiveness***

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SCIENCE & TECHNOLOGY POLICY

Germany: Research Ministry Subsidizes Supercomputing Projects

M12109133193 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
30 Jul 93 pp 8-9

[Text] Over the next few years, the BMFT [Federal Ministry of Research and Technology] will make approximately 40 to 45 million German marks [DM] per year available to R&D organizations and project funding agencies for parallel high-performance computing applications. The priority areas will be knowledge transfer from science to industry, demonstrating the potential of scientific high-performance computing to a wide range of industrial users, and offering them assistance in adopting this technology. The goal is to strengthen the essential interdisciplinary cooperation among scientists and engineers working in research and industry and those working in the two exact scientific disciplines:

- applied mathematics (development of new parallel computing methods), and
- information systems (methods and tools for efficient and reliable implementation of parallel algorithms and for the conversion of existing sequential software to parallel computers).

The following four R&D areas, together with infrastructural or organizational measures, are planned. Applications are rigidly allocated to projects involving mathematical modeling or methods and software development.

1. Application-Specific Development of Simulation and Forecasting Models

This first R&D area covers the application-specific development and establishing the theoretical bases of complex, generally high-resolution simulation and forecasting models for use with parallel computers.

2. New Mathematical and Information System Methods for High-Performance Computers

This second R&D area concerns the development by mathematicians and computer scientists of methods which are largely common to all applications.

3. Development of Methods and Software Tools

For parallel computers in particular, there is a considerable R&D requirement for developing efficient and user-friendly systems and application software.

4. High-Performance Computer Connections

Installing high-performance computers inevitably provides access to them by a wide range of potential users, including external ones. Given the need for standardization, the R&D programs required in this area are international in scale and are being carried out through European research funding programs.

5. Infrastructural and Organizational Measures, Expansion of HLRZ [High-Performance Computing Center]

The BMFT draft plan includes a proposal to potential industrial and scientific users to cooperate with computer scientists who already have extensive experience in parallel high-performance computing. The computing capacity needed for this task will also be provided. Specifically, it is intended to expand the infrastructure of the scientific high-performance computing center (at the HLRZ, GMD [German Society for Mathematics and Data Processing], and KFA [Juelich Research Facility] centers).

For industry, there is the particular prospect of interactive computer simulations being largely able to replace expensive and time-consuming series of experiments. This means a significant reduction in innovation cycles for industrial product development.

Parallel high-performance computing will be important for those industries which play a major part in Germany's exports, such as the pharmaceutical, chemical, and automobile industries.

Overall, this new sector of information technology will make a major contribution to Germany's future as a technical, scientific and industrial base.

In 1992, in its Funding Plan for Information Technology (1993-1996), the BMFT announced the publication of a detailed brochure on scientific high-performance computing. This brochure, entitled "BMFT Funding Program for Parallel High-Performance Computing in Science and Industry," is now available, and can be ordered from the Federal Ministry of Research and Technology, Department 413, Heinemannstrasse 2, 53170 Bonn.

Germany: Research Ministry's 1994 Budget Presented

M11309152493 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
30 Jul 93 pp 2-3

[Text] The prevalent mood in Germany is fear of technology, rather than creativity, stated Federal Research Minister Dr. Paul Krueger when presenting the BMFT [Federal Ministry of Research and Technology] draft budget for 1994. He felt that the emphasis seemed to be on trying to "fence in" innovation potential, rather than releasing and encouraging it.

Hysteria, extending even to small first steps into technologically uncharted areas, is taking the place of justifiable caution, rationality, and confidence in creative power.

This results in a trend towards emigration among potential key innovators in Germany.

Some scientists are treating research fields like heirlooms, instead of playing a lively, dynamic, and flexible part in the competition of ideas. They are leaving the forefront of innovation to others, such as the Japanese, instead of being led by an eagerness to experiment to try out and implement a wide variety of innovations. Barriers between science and industry, between developers and users, between technology and the arts, are preventing the integration of different kinds of know-how into new products and processes.

Krueger sees the priorities of his research and technology policy plan in the following areas:

- The BMFT will give new impetus to the debates over genetic engineering and energy, over transportation solutions and information technology, and generally over future prospects of new technologies.
- The BMFT's purpose in doing so, however, is not to encourage differences of opinion, but to create new models which match with the vision of the future shared by most people in our country.
- Competition for research funding must be supported by targeted processes, by rewarding success, mobility and ideas, rather than by long-term funding.
- The BMFT will create the conditions needed in organizations to increase their competitiveness and mobility, for more personal initiative from below.
- The BMFT will intensify discussion between industrialists, scientists and politicians through measures to improve cooperation between industry and science, and in the strategic dialog with those involved.

The BMFT will take appropriate steps to simplify and streamline "research-unfriendly" areas, such as legislation in order to improve overall conditions.

Research policy will intervene more strongly in the public debate over technology and employment, over creating rather than obstructing, over future potential rather than apathy.

The federal government's search for savings will not leave the BMFT's budget unscathed: The BMFT's funding in 1994 for research and technology will be no greater than for 1993, i.e. around 9.47 billion German marks [DM]. The BMFT firmly intends that this sum will tackle the major tasks needed to safeguard Germany's future, without significant cutbacks. In less urgent areas, however, reductions and reorganization will be unavoidable. What matters is that no loose ends are left untied, particularly in areas where industry and science share the view that the long-term maintenance of specialist skills is essential.

Priorities

Priorities are reflected in budget allocations, not only for the core areas of major interdisciplinary technologies, such as biotechnology (up 2.3 percent) and traffic and transport technology (up 4 percent), but also for preventative health research (up 3.3 percent), ecology (up 2.2 percent), and climate research (up 1.8 percent). Development of environmental technology is another priority, although special attention must be given here to defining responsibilities: Those initiating and using environmental R&D need to play a greater part in its financing.

In addition, the Scientific Council's assessment will reveal further prospects for the future, which will be considered in future funding allocations.

Information technology, probably today's major interdisciplinary technology, is also a priority area, as is also shown by the total volume of government funding (from federal, laender and EC sources), at DM1.8 billion per year. Due to the considerable increase in TELEKOM's R&D expenditure and the steady growth in EC funding for information technology, the BMFT has slightly decreased total funding for information technology, while increasing that for the new basic technologies of information and communications technology. It should be borne in mind that this area of funding has achieved high standards in recent years.

Areas To Receive Reduced Funding

Significant reductions in funding will in contrast have to be made in such areas as power plant technology, aviation/hypersonics research, marine technology, research to improve working conditions, and protection of historic monuments. Funding for scientific basic research and contributions under international commitments have also been reduced from planned levels.

Special Case of ESA Funding

The federal government has also authorized the research minister to negotiate a reduction in the BMFT's ESA appropriation for 1994. The savings achieved here can then be reallocated to priority areas in the course of parliamentary discussions. The BMFT is trying to achieve a considerable sum here, and will make full use in a different area of the available scope for flexibility; even with scarce resources, it is necessary to be able to react at an early stage to changed research requirements.

BMFT as Reliable Partner

Germany is a reliable partner, and will meet its obligations in financing its international cooperation. The present redesign phase of the U.S. space station plans shows, however, that a great deal needs to be reorganized in this area, and that previous timescales and program priorities must be examined. The financial goal and priorities of our partner countries have also changed.

The BMFT is also showing soundness in its planning in the sensitive area of institutional funding, which is now

targeted specifically on longer-term areas. This can be seen with the rates of increase, agreed some years ago, for the MPG [Max Planck Society] (up 5 percent) and for the FhG [Fraunhofer Society] (up 5 percent); these figures do not include additional subsidies for reconstruction in the new laender. It has for some time been clear that the large-scale research establishments will also receive only the same total funds for 1994 as for 1993. There will be no further reductions in the economic plans already prepared for 1994.

New Laender Receive Priority Treatment

Research in the new laender has been a high BMFT funding priority since unification. This will continue in 1994, both in institutional and project funding. The federal government agrees that there is a need for increased efforts in this direction. An additional DM100 million is being made available for research institutions in the new laender, equivalent to an increase of 13.7 percent. A totally new funding initiative, the financing of innovation colleges at universities in the new laender, is intended by the BMFT to encourage innovative, interdisciplinary cooperative projects by university researchers with external specialists, including those from industry. It is intended to allocate additional funds to the BMFT during further parliamentary budgetary procedures. To support product innovation, which is a prerequisite for a viable economic recovery in the new laender, adequate resources must be provided.

Funding for Small and Medium-Sized Companies

Funding of medium-sized firms continues to have a high priority: Subsidies for indirect and indirect-specific measures are again to be increased in 1994, since the BMFT considers them important: The ability to transfer innovations rapidly into marketable products is necessary for the survival of medium-sized companies in international competition involving technological goods.

Competitive Strengths of Space Powers Compared

*BR2109130093 Rotterdam NRC HANDELSBLAD
in Dutch 13 Aug 93 pp 11-12*

[Article by Ferry Versteeg: "Saturation Endangers Space Market"]

[Text] Despite rosy predictions, the growth of commercial space travel is proving disappointing. Faster technological improvements are resulting in constantly more powerful satellites which last longer. And that is hurting the market. Most important of all is that the Russians, Chinese, and Japanese now carry out their own launchings. Can the Europeans with Arianespace maintain their current favorable position?

The glorious blue skies which once attracted large numbers of aerospace companies toward the commercial space sector are now clouding over. As a result of spectacular technological improvements and the arrival of new players on the field—Japan, China, and, in

particular, Russia—saturation and overcapacity are threatening the market. To put it more simply: Too many bidders and launchers are chasing too few customers and payloads. This has changed the rocket and satellite high-technology construction industry, until recently accustomed to few market participants and great security, into a high-risk industry with prospects that are often uncertain.

It is becoming clearer every day that high-speed technical progress does not necessarily lead to commercial advantages. Because the launchers are becoming more accurate while satellites are becoming constantly more sophisticated, their in-orbit lifetimes are longer. Whereas halfway through the 1980's the life expectancy of the average "artificial moon" was 10 years, it is now already 15 years. They therefore need to be replaced less often. Above all, modern rockets are able to carry more tonnage into space in one go, and that damages the market.

Then there is the fact that the commercial space market mainly involves telecommunications, where improvements are particularly noticeable. This means that new satellites with constantly smaller-size on-board electronics are constantly being provided with greater transmission power. As a result, the present generation of satellites can cope with more telephone calls, faxes, and data transmission than is really needed. In addition, telephone companies are increasingly interested in fiber-optic sea-bed cables, which makes it clear that the commercial space sector is less booming than was forecast a decade ago.

However, it is still a large market worth some \$14 billion every year; a market which at the moment, it is true, is showing a moderate growth, but which in the latter part of the 1990's, with the expected arrival of global, satellite-transmitted mobile telephone systems, will once again develop rapidly.

Curiously enough—as it was not planned in this way—the three powers mentioned above each dominate a particular part of commercial space traffic. In the satellite manufacturing sector, which was worth about \$2.5 billion last year, American companies sweep the floor with the rest of the world. Market leader Hughes Aircraft of Los Angeles still has the most to fear from fellow-American rivals such as Loral and General Electric. Together, the Americans supply three-quarters of the world's requirements for satellites. Their dominance becomes relative, however, in conjunction with their dependence on satellite components from Japan. European builders are well to the rear and have to make do with a small specialist market here and a solar panel there. That companies such as DASA [Deutsche Aerospace] from Germany, Aerospatiale and Matra from France, or GEC [General Electricity Company] from Britain still exist as satellite manufacturers is primarily due to orders from their own governments for scientific space research and earth observation purposes. Even that was not enough for the satellite constructors at

British Aerospace. Their department closed down not long ago because the parent company was unable to find a single interested purchaser.

Japanese companies dominate the lucrative ground equipment sector, which involves some \$6 billion annually. Mitsubishi Electric, NEC [Nippon Electronic Company], and Toshiba lead the field in this area, although they are also complaining about shrinking markets. "The increasing capacity of the ground equipment, coinciding with the fast development of satellite technology, means that our market cannot grow very quickly," so were the fears expressed by a spokesman from NEC, the world's leading manufacturer of space antennas.

As far as commercial rocket launching is concerned, the pace is set by Paris-based Arianespace—officially owned by some 50 European firms and five European governments, but in fact dominated by the French. Out of the total of 43 commercial satellites which were launched in 1991-92, 22 went up with the Ariane-4 rockets from the Kourou launch site in French Guiana. By the late 1990's, the not always reliable Ariane-4 will gradually be replaced by the Ariane-5, up to now Arianespace's most potent commercial weapon, which can easily take a 7,000-kilo payload into distant orbit around the earth.

Last year Arianespace recorded a net profit of 50 million Dutch guilders on total revenues of 1.7 billion. "In the last 18 months we have been able to book 19 orders, about 55 percent of the world market, despite strengthening competition," assured spokesman Claude Sanchez of Arianespace. "These new contracts, many of which come from Asia, bring our order book up to a total of 40 satellites still to be launched. That implies \$3.5-billion in revenues and work for the next four years." The Ariane rockets have in particular their proven reliability to thank for their popularity; in the last few years fewer than one in 10 launches suffered complications. This is something that customers are particularly sensitive about. Insurance companies are not too keen on covering such colossal risks, and failures can very quickly cost tens of millions [currency not specified].

That the Americans, with their acclaimed space experience in the government-military sector, saw themselves trumped by relative newcomers from Europe in the commercial space market, and now hold less than one-third of the launch market, is astonishing but on closer examination not difficult to explain. American companies such as General Dynamics (Atlas), Martin Marietta (Titan), and McDonnell Douglas (Delta), developed their rockets at the time to the requirements of the U.S. Government and the Pentagon, and these remain by far their largest customers. Operating in such a protected market obviously does not stimulate any tendency toward innovation. All the larger American rockets were developed before 1970, which frequently has led to expensive launch postponements or even failures.

When Washington, following NASA's Challenger shuttle disaster in 1986, all at once called off any further

commercial satellite launches by shuttle and pushed them on to the private sector, it was not too difficult for Arianespace in Europe to leave far behind them the pampered American competition with its outdated, less reliable equipment. Martin Marietta in fact left the commercial space market last year because it appeared to be much more lucrative to send Titans up into space for the U.S. Air Force. But even the USAF has now called a halt to launches which use the Titan for an indefinite period following the explosion of a Titan-4 with an expensive military satellite on board at the California base, Vandenberg, on last 1 August.

A joint attempt by all American rocket manufacturers to have Washington pay the development costs for a new commercial booster rocket via a National Launch System Program was rejected by Congress last year. Now the five leading American rocket builders are apparently aiming for a subsidized consolation prize. They have invited NASA to work with them on a modernization project so as to be able to win back some ground from the Europeans with Arianespace.

It is clear that both Europe and America, who between them control 90 percent of the commercial launching market, can expect strong competition. From the Japanese, for instance, who have already achieved several successful launches of their H-1 rocket and who are now putting the finishing touches to the H-2, which will be ready by next year and will be capable of taking a load of 4,000 kilos into distant orbit. Managers of the \$3-billion project are claiming, however, that no positive efforts will be made to sell the H-2 outside Japan. "The market is simply too small for yet another tenderer," said a spokesman for Mitsubishi Heavy Industries, one of the project leaders. The fact remains that, with the arrival of the new rocket, a good part of the Japanese market will no longer be available to European and American launchers.

The Chinese, whose Great Wall Industry has been offering the Long March rockets since 1990 as commercial satellite launchers, are showing themselves to be more expansionist. Their biggest asset is the price: only \$35 million per launch, about half of what is asked in the West. A disadvantage which cannot be ignored, however, is the fact that two of the three Long March rockets launched since 1991 exploded prematurely. As a result the unfortunate Great Wall Industry has received no orders this year but for 1994, according to the proud Chinese, another launch has been booked. What they do not say is that the customer is a consortium of three Chinese public companies chaired by the Chinese Assistant Minister for Telecommunications, Xie Gaojue.

The greatest threat to the West comes from Russia. Despite being ruled by chaos and lack of money, the still giant Russian space industry managed to send some 50 large rockets with variable payloads into the atmosphere last year. Not long ago, Lockheed, one of the United States's largest defense contractors, signed an agreement with the Russian Khrunichev Enterprise to sell its

famous Proton rocket at an extremely competitive price on the world market. And last December the Russians signed their first commercial launch contract with the London-based Inmarsat telecommunications consortium. In 1995 an Inmarsat satellite will go up for a nominal, bargain price of \$36 million. However, Olof Lundberg, the consortium's managing director, admits that "the launching of the American-built satellite by the Russian Proton rocket will entail quite a few expensive additional costs and adaptations because of the differences in the two systems."

There is, for instance, the "chicken on a spit" problem. When Western satellites separate from their Western carrier rockets, they rotate around their axis so that all surfaces are exposed equally to solar radiation and other space elements. Satellites launched by the Proton do not rotate, so the Inmarsat satellite will have to be fitted on one side with extra heat-resistant shields. Furthermore, the average Western satellite has its own rocket engines which are used to maneuver the vehicle into its final position, while the Proton is fitted with a fourth stage which performs that task. There are many other system differences. "With all the adaptations, the prices for Western and Russian launches are in the end not so very different," claims Lundberg.

Still, Western suspicions about possible disturbances in the market from the giant Russian space industry remain strong. Although the Europeans are the dominant satellite launchers, it was the Americans who took the initiative this year to check the Russian "threat" to their commercial space industry. Assistant U.S. Trade Representative Peter Allgeier entered into an agreement last June with the Russians whereby the latter committed themselves to launch no more than two large commercial satellites per year between now and the year 2000. Agreements concerning the launch of small, low earth orbiting satellites will be discussed as each case arises.

Despite American invitations for Europe to take part in this agreement with the Russians, Arianespace and the European Space Agency (ESA) are scowling in the other direction. "Arianespace should absorb its part of the blow inflicted upon the West and not begrudge the Russians a reasonable share in the launch market," U.S. negotiator Allgeier said irritably. "But the Europeans are trying to combine such a Russian market entry with a European right to bid for U.S. Government orders, and are therefore blocking a wider agreement."

"Nonsense," replies spokesman Sanchez of Arianespace. "We are also advocating structured forms of competition to prevent market deterioration and to make sure that all parties get a fair share of the market, but Europe must remain alert because, as leader in the commercial launching market, it has the most to lose."

This concern of Arianespace's has not been simply plucked out of the air. The European consortium is threatened with missing the boat in the installation of vast satellite networks all around the earth to provide

global mobile telephone services. And these are just the megaprojects which will give new impetus to the rather sickly commercial space industry.

The U.S. companies Loral and TRW are developing plans in this direction, but the most advanced project is the \$3.5-billion "Iridium" mobile telephone project of Motorola, another U.S. company. In the late 1990's, this project will have 66 small satellites in low earth orbit which will enable mobile phone network subscribers to reach every remote corner on earth—from the North Pole to the Kalahari Desert, or from Tahiti to Mount Everest.

Financiers from all over the world reached an agreement at the beginning of this month for the financing of the first stage of Iridium, valued at \$800 million. In the meantime, Motorola has signed launching contracts with several U.S. companies such as Lockheed and Raytheon, with the Russian Khrunichev Enterprise, and—last week—with the Chinese Great Wall Industry. But market leader Arianespace has for the time being been left out of this American initiative.

Sweden: Ten Billion Kronor Fund for Strategic Research

Two Foundations Created

93WS0666A Stockholm SVENSKA DAGBLADET
in Swedish 14 Aug 93 p 11

[Article by Sigfrid Leijonhufvud: "Social Democrats Cannot Change Foundations"]

[Text] A future Social Democratic government cannot alter the conditions the Riksdag approved on 3 June for the foundations that will administer most of the 10 billion kronor in wage-earner fund assets. The bill was opposed by the Social Democrats.

"They will be legal entities under civil law and will remain regardless of what happens politically," Education Minister Per Unkel (Moderate) explained when he presented the directive to the organizing committees on Friday.

Money for Research

The money will go to research that is or has the potential to become internationally outstanding. Six billion kronor will go to a foundation for strategic research, 2.5 billion to a foundation for strategic environmental research and 1.5 billion to the National Bank's Tercentenary Foundation fund for research in the humanities. The foundations, which will start functioning at the beginning of next year, will administer the assets left in the 1992-94 fund—the former wage-earner funds.

The government bill called for spending the money in 15 years, but the Riksdag amended this so that about 10 percent of the original capital can be spent a year—which could correspond to yield. Unkel said yesterday that he

is satisfied with this decision and stressed that the amount should be less in the initial stage. According to him, too much research money too quickly is almost as harmful as too little.

Must Be World Class

The two new foundations will be run by a board of 11 members, three of them from other countries. This is an effort to guarantee that research projects maintain world class standards. The respective boards will include a representative of the government who will appoint the entire first board for a mandate period of four years. After that the boards will be responsible for appointing new members.

The government has selected Professor Bertil Aronsson, who now leads Sandvik's research company in Grenoble, France as chairman of the board of the strategic foundation. Ingvar Lindgren, physics professor at Chalmers Institute in Goteborg, has been appointed as head of the foundation. The chairman of the strategic environmental foundation will be Professor Ingmar Grenthe of KTH [Royal Institute of Technology] in Stockholm, with Environment Ministry Undersecretary Goran Persson, Doctor of Engineering, as chief.

The sum of 250 million kronor a year is a substantial increase for environmental research. For example it exceeds the 150 million kronor which the Environmental Protection Agency's research committee distributes annually.

Compared with the 40 billion that is spent on research and development annually—18 of which come from the state—0.6 billion for strategic scientific and medical research may seem like just a little frosting on the cake. But Aronsson is still optimistic. In addition to individual development projects that are financed in other ways, money is needed for interdisciplinary research efforts that are now underfunded.

Decisions will not be made solely on the basis of applications, the foundation will devote itself to seeking out the best projects.

"Basic research has been afraid of being left out, but that will not be the case," insisted Ingmar Grenthe of the environmental foundation.

No Stimulus for Saving

The government wanted to spend around 6 billion of the 22 billion kronor—most of it in stocks—that is left of the wage-earner funds on measures that would stimulate saving. However last fall's crisis agreement nipped this plan in the bud. Unckel admitted yesterday that otherwise the money would have been lacking this spring for the 10 billion he has been promised for research. Some 1.7 billion has already been earmarked for establishing the foundation colleges and 6.5 billion has gone to venture capital companies.

Until recently the funds have also been greatly depleted as a result of the stock market decline. Now, according to the education minister, there is a surplus of 3 billion kronor—as a buffer against new price declines. But if the stock market drops sharply again before the assets—mostly in the form of stocks—are transferred to the new foundations and the Tercentenary Foundation—the appropriation will have to be trimmed. That is what the Riksdag has decided.

Foundations' Directors Named

93WS0666B Stockholm DAGENS NYHETER
in Swedish 14 Aug 93 p A12

[Article by Lilian Ohrstrom: "Billions to Be Distributed"]

[Text] Six new Swedish power figures were presented by Education Minister Per Unckel on Thursday.

They are the five men and one woman who will decide how the wage-earner fund money that has been earmarked for the research foundations will be distributed. They will have 10 billion kronor at their disposal for strategic research efforts and the aim is to contribute to Sweden's future competitiveness.

"Swedish research is good, but much too subject-oriented. We must break through the limits. The problems today are so complex that one must have an idea of where to look for solutions."

So said the newly appointed chairman of the foundation for strategic environmental research, Ingmar Grenthe. He is a professor of inorganic chemistry at the Royal Institute of Technology in Stockholm and is now starting to work on finding strategic problem for environmental research.

Transportation System

"This does not involve problems that industry should solve, but problems in the broader sense," he continued. One example is the question of what type of transportation system is needed in a postindustrial society. The choice of system involves environmental consequences over a broad area.

"Such discussions must include representatives of research, industry and society. Often very interesting discussions are held at research conference, but no one can come up with the money that is needed. We will be able to provide that," Grenthe said.

Bertil Aronsson, managing director of Sandvik's research laboratory in Grenoble, France, has been appointed as chairman of the strategic research foundation. The foundation has 6 billion kronor to use to support technical, scientific and medical research.

Aronsson is very enthusiastic about the possibilities.

"We will support big projects where researchers from different disciplines work with industrial firms as well as with clients in the public sector," he said.

Enthusiastic

One example of such a client is the health care sector.

Today the state spends a total of 12.5 billion kronor on research grants. The addition of 10 billion kronor from the wage-earner funds does not mean the amount will be doubled, however. The 10 billion kronor will be funded and spent over a period of around 15 years. But close to a billion kronor a year is an increase of almost 10 percent.

There are already lots of proposals concerning the best way to use the money.

The debate was sparked after a group of people on the medical research council wanted to give all the money to themselves. But that was in the stage where the researchers were asked to play with the idea of how the billions in the wage-earner funds should be used and before the idea of the foundations became clear.

Now the foundations will take the initiative in determining the target-oriented research projects that they will support.

Three foundations will divide the money. The biggest share will go to the foundation for strategic research.

Its chairman, Bertil Aronsson, will have Ingvar Lindgren, professor of physics at Chalmers Institute of Technology in Goteborg, at his side as chief. The administrative leader will be Sonja Dahl, who has long been department chief in charge of research at the Education Ministry.

The foundation for strategic environmental research will get 2.5 billion kronor for its fund. In addition to chairman Ingvar Grenthe, current Environment Ministry Undersecretary Goran Persson will be chief and Bjorn Englund, who is now head of technological infrastructure in the Office of Business Economics, will be administrative leader.

The remaining 1.6 billion will go to a fund for research in the humanities that the National Bank's Tercentenary Foundation will administer. This means that humanistic and social science research, which now receives 250 million kronor in state appropriations, will get an additional annual infusion of 150 million for the research needs created by rapid technological, economic and social changes.

"The composition of the leadership of the foundations guarantees that the money will do some good," said Per Unckel, alluding to the fact that the personnel represent both research and industrial development.

The foundation boards have not yet been appointed. However they will consist of 11 people, seven from

Swedish research and industry, three foreign members and one government representative.

Foundations Protected

The nonsocialist government pushed the research foundations through in the spring with the support of the New Democracy Party. The Social Democrats opposed the proposal and wanted to transfer the money in question to pension funds to strengthen the ATP [General Supplementary Pension] system instead. The Social Democrats wanted to channel 1 billion kronor to research via the national budget.

What will happen now if there is a change of government after the next election?

"The foundations will be projects that come under civil law and will thus be protected," said a very satisfied Per Unckel.

While Aronsson would not comment on the different political aspects, Grenthe said that the foundation form provided security.

German Institutions, Industry To Increase R&D Cooperation

MI2109152293 Munich SUEDEDEUTSCHE ZEITUNG
in German 8 Sep 93 p 26

[Text] Industry and the major research institutes intend to work more closely together to secure Germany's position as a center for industry, it emerged from talks between the Association of Major Research Institutes (AGF) and the Confederation of German Industry (BDI) Research and Technology Policy Committee.

A joint declaration stated that the rapid translation of research results into applications in various branches of industry would give a major boost to the economy. Existing models of cooperation, such as joint projects and representatives from industry sitting on the major research institutes' supervisory boards and advisory panels and the institutes' working parties, would be pursued further.

A form of limited-term collaboration referred to as "temporary institutes" is also being contemplated, the idea being to increase industrial involvement, and hence application-orientation, up to the product development stage. As Heinrich Hofer, head of the BDI's research and technology department explained in answer to a question, limited-term collaboration of this sort could last from two to 10 years. It was quite conceivable that the project leader would come from industry.

The BDI and AGF also refer to the work of the Weule Commission. This four-strong panel of experts, named after Daimler-Benz research director Hartmut Weule, was appointed by Heinz Riesenhuber during his term as research minister but has only just had its first meeting owing to the frequent ministerial changes of recent times. The brief of the commission, which is composed

of representatives from Siemens, BASF, and the Federation of Industrial Research Associations (AIF) in addition to Weule, is to consider the industrial relevance of the major research institutes from the point of view of the economy.

Aided by experts from private industry, it will first assess the Karlsruhe Nuclear Research Center (KfK) and the Juelich Research Center (KFA), both of which, like all 16 major German research institutes, are very largely financed by the Federal Government. The Weule Commission is scheduled to submit its report in spring 1994.

The BDI and AGF criticized the "freezing" of the Bonn research budget over the next two years, stating that this was at odds with a policy that aimed to enhance Germany's scientific and industrial competitiveness. This was the very time when greater investment was called for in all areas of research. Hoefer advocated tax incentives for the creation of research teams and the recruitment of research personnel.

Strategy Panel Appointed

Federal Research Minister Paul Krueger (CDU [Christian Democratic Union]) has appointed a "Research and Technology Strategy Panel" to foster the dialogue between industry, science, and state, its brief being to study long-term trends and to map out the technological future of Europe. The members of the panel, which is due to hold its first meeting on 22 September, include high-ranking representatives of industry such as Edzard Reuter (Daimler-Benz), Manfred Schneider (Bayer), and Lothar Spaeth (Carl Zeiss Jena). Ernst-Ludwig Winnacker (University of Munich) and Hubert Markl (former chairman of the German Research Association) are among its leading scientific members.

Flemish Government's R&D Funding Detailed

BR1409121493 Antwerp DE FINANCIËLE-
EKONOMISCHE TIJD in Dutch 10 Sep 93 p 3

[Unattributed article: "70 Percent of Flemish Science Funds Goes to Universities"]

[Text] Almost 70 percent of the funds for Flemish scientific research goes to the universities, according to a brochure from the Department for Scientific Research Programming of the Flemish Community Ministry. The universities account for 69 percent of all scientific research funds, which total 28.358 billion Belgian francs [Bfr] in 1993. It is subdivided into 42 percent for operating costs and 27 percent for research. Other scientific institutes receive 14 percent. Ten percent goes to industrial research, and 6 percent to policy research. In 1992, the academic staff in Flanders consisted of 3,910 people. In 1991, 9,761 people graduated from Flemish universities. In 1991, well over 6,000 people were working on new materials R&D. In the R&D field, microelectronics has the largest share of the budget (Bfr6.143 billion). Among the Flemish

Government's key sectors, environmental technology is scoring worst, both in terms of staff (1,097) and budget (Bfr926 million).

CORPORATE ALLIANCES

ESA Concludes Cooperation Agreement With Finland

BR2209081293 Paris ESA PRESS RELEASE
in English 25 Aug 93 p 1

[Unattributed article: "New Agreement With Finland"]

[Text] An agreement between the European Space Agency (ESA) and Finland was signed today, Wednesday, 25 August 1993, at ESA Headquarters in Paris by His Excellency Matti Hakkanen, Finnish Ambassador to Paris, and Mr. Jean-Marie Luton, Director General of ESA.

This agreement covers Finland's participation in ESA's General Support Technology Programme (GSTP), the primary objective of which is to develop identified critical technologies. Finland is already contributing to the Agency's science, earth observation and telecommunications programmes, and its participation under the terms of this agreement is to be focused in particular on studies concerned with Earth/Space telematics networks, deep space observatory facilities, and global earth monitoring.

The agreement covers phase 1 of the GSTP, which is scheduled to last three years, with a financial envelope of ECU31 million.

Currently an Associate Member of the Agency, Finland has opened negotiations with ESA on the formalities required for it to become a full Member State.

Bavaria Opposes Takeover of IABG Defense Firm by US Group

MI2109081093 Munich SUEDEDEUTSCHE ZEITUNG
in German 8 Sep 93 p 10

[Article by Christian Schneider: "End of the High-Tech Dream: The IABG Research Factory in Ottobrunn Sold to United States—Bavaria Up in Arms Against Waigel: 'Depletion of Resources of Value for German Competitiveness'"]

[Text] The government of Bavaria wants the Free State to maintain its leading position as a high-tech land, and, in a bid to further this intention, Trade Minister Otto Wiesheu has just presented the "Bavaria 2000 Campaign," to which 650 million German marks [DM] have been allocated. Whether this funding will bear the desired fruit remains, at least for the time being, open to question, for on the very day that Wiesheu presented his campaign to the press in Munich, his party leader, Federal Finance Minister Theo Waigel (CSU [Christian Socialist Union]),

announced his decision to sell the federal-owned Industrial Plant Operating Company Limited (IABG) to the American group BDM International.

The IABG, which is located in Ottobrunn, just a few miles from Munich, is not just any old company: It is a research think tank that has constituted, since it was founded 33 years ago, one of the foundation stones on which Bavaria has built up its reputation as a high-technology land. There is consequently a good deal of acrimony in Bavarian government circles over their fellow party member in Bonn and his decision to sell, which has been preceded by a hard-fought tug-of-war behind the scenes.

Blueprints Exposed

At least in Ottobrunn, there is anxiety as to whether the American takeover of the IABG will have positive or negative consequences. Weeks ago, major clients from other European countries who have trials on their latest high-technology developments carried out on the IABG's test benches were already letting it be known more or less pointedly that they would stay away if an American company were to take over the Ottobrunn research and testing facility. This attitude stems from a fear that the Americans could get an easy look at European blueprints via the German test facility. This is also one of the reasons why the IABG's European business partners have been astonished at the way Germany has been treating this valuable resource.

If the clients stay away, jobs will be jeopardized, at a time, moreover, when other high-tech companies in Ottobrunn, for instance German Aerospace (DASA), are contemplating restructuring and "slimming down" their workforces. Many fear that what is happening in Ottobrunn could be the start of a brain drain from Bavaria: Without its scientists, engineers, and technicians, Bavaria's claim to status as a high-technology land would be difficult to sustain.

Meanwhile, back at the Federal Finance Ministry in Bonn, where the privatization of the state-owned IABG has been pushed through with determination, they cannot quite see what all the fuss is about. The ministry's position is that, in the first place, Bavaria was given a chance to put together a German consortium to take over the facility, supplanting the American company BDM International (McLean, Virginia), which had been on the scene from an early stage. Second, it is claimed, now that the Americans have pulled the deal off, that German interests will continue to be safeguarded.

To give this promise greater credibility, the Finance Ministry has come up with the following share structure: BDM International will acquire a 45-percent holding in IABG, 15 percent will remain, for the time being, in the hands of the federal-owned Industrial Administration Corporation (IVG), and the remaining 40 percent will be held initially by a German trustee with a mandate to pass the shares on to German companies at a subsequent stage.

The Bavarians regard Waigel's statement, intended to reassure them, that the majority IABG holding will still remain in German hands, as a cardsharp's trick. After all, in spite of their minority holding, the Americans are to take over the running of the company. It is also assumed in Munich that BDM and the IVG will come to a tacit pool arrangement, which would give the Americans a majority share. As far as the German firms that would be brought in to acquire the remaining 40 percent were concerned, said Bavarian Trade Minister Otto Wiesheu at the end of August, with the sarcasm born of anger, they would have little more than a "hyped-up walk-on part."

The contract still has to be finalized, but hardly anyone still entertains doubts that it will be concluded with BDM, as announced by Waigel. Federal Finance Ministry officials stated back at the end of August that Bonn would accept no other solution, thus putting paid to the German consortium brought together by Wiesheu just four days after its creation.

Grandiloquent Declarations

It all seems safely tied up already. Next Monday a new managing director is to be installed at IABG. His name is Bill W. Sweeney Jr. and he comes from, guess where, BDM International, where he currently holds the post of vice president. IABG's supervisory board is scheduled to give Bonn's proposals its official blessing on the same day, but it is only two days later, on Wednesday, that the supervisory board of IABG's parent company, IVG, which will actually decide everything, is due to meet.

In this body, on which employer and employees have the same number of seats, the IABG workforce representatives could still put a spoke in the wheel of Finance Minister Waigel and his officials. To date, in fact, the Americans have only made "grandiloquent declarations of intent," says general works council chairman Dieter Koenig, but no one knows yet how things will actually turn out. "We want something definite on the table," says Koenig.

The very speed with which Bonn is pressing ahead is revealing. Unless IABG is privatized, its parent company, IVG, cannot be privatized either, and Waigel wants to sell it before the end of the year, thus pouring about half a billion marks into the Finance Ministry's empty coffers. Bavaria's high-tech dreams will find little sympathy in that quarter.

CORPORATE STRATEGIES

German Machine Tool Companies Consider Cooperation in European Market

93WJ50632 Coburg MASCHINE & WERKZEUG
in German Jul 93 No 11/12 pp 35-43

[Article by "gmf": "Shaky Ground: How Grundig and Philips Want To Change The CNC Market" first paragraph is MASCHINE UND WERKZEUG introduction]

[Text] Finally—late, but perhaps not too late—the realization is dawning among machine tool manufacturers and the producers of computer numerical control (CNC) components that only cooperation can stave off Japanese dominance of the industry in Europe. Surprising changes are on the horizon if the CNC market is reorganized in accordance with the suggestions by Philips/Grundig.

"Trying to get machine tool builders to agree on anything is next to impossible!" This is how the manager of the German branch of a foreign CNC manufacturer described the problem. Dr. Berthold Leibinger, president until the end of last year of the Association of German Machine-Building Enterprises (VDMA) and himself the owner of a machine tool building enterprise, repeatedly bemoaned the "thick-headedness" of German machine builders, who have been unwilling to agree on standard controller architectures. On 5 February 1993, a number of leaders in the field met with Dieter Spoeri, economics minister for Baden Wuerttemberg, to discuss the problem. Among those present were Wolfgang Kelch (VDMA, Baden Wuerttemberg), Dr. Dieter Hundt (chairman of the Association of the Metallurgical Industry of Baden Wuerttemberg (VMI)), and Klaus-Dieter Voehringer (Mercedes Benz AG board of management). The group reached the following conclusion: "One of the most critical issues is control engineering. If the German machine tool industry does not succeed in working together with German buyers and producers of control engineering components to develop a controller that can hold its own on the world market, more and more German machines will be equipped with Japanese controllers, and the majority of the know-how will shift to the Japanese firms."

Thus far, every attempt to persuade the German machine tool builder industry to agree upon a common architecture has met with failure. In an interview given last year, Dieckmann, head of engineering at Gildemeister AG, explained why "There is not enough pressure yet."

This has since changed, at least for Gildemeister. In February, the struggling conglomerate sold 51 percent of its Hannover-based subsidiary, Gildemeister Automation, which produces Gildemeister's own Eltrapilot controllers, to the Fuerth-based firm Grundig AG.

It is unlikely that Gildemeister profited greatly from the sale. The Hannover firm, the last of the "Seven Upright Firms" produced controllers using the MPST architecture, which at one time was state-of-the-art, but is now outdated. Although the Gildemeister controllers have long had an "open" system architecture, this concept has never met with much commercial success, and Gildemeister is its subsidiary's sole customer. Pressure from the Japanese caused the field of control engineering to advance further and more rapidly than the development team in Hannover could keep up with or the parent corporation in Bielefeld could pay for.

The Gildemeister case demonstrates the failure of the ambitious plans by German machine tool manufacturers to use the key "CNC controller" technology to pull away from their competitors from the Far East. Even Grundig felt—as did the entire industry—the sting of dwindling inventories and exploding development costs. A lack of clear guidance caused Grundig developers problems during the production of the "Dialog 11" controller for Deckel AG of Munich. Deckel AG was forced to absorb heavy losses as well, however, because their ambitious control architecture did not make it to the market on time.

Philips Maho had no better luck. The Dutch tandem lost money on the development of its most recent control technology, which was conducted under the guidance of former Maho boss Werner Babel. This is because, with the exception of the special line for Maho, it was no longer possible to sell enough of even the Philips Maho 5000 line of controllers to bring them back down to economically reasonable quantities. Maho, for its part, was only able to meet the stated development objectives by providing manpower and know-how.

The situation has since changed radically, however. The CNC market has picked up, and former competitors suddenly find themselves operating under one roof. In early 1993 Grundig electronics, a newly established business line of the flagging entertainment electronics firm, became the head of an impressive conglomerate. Late last year, Philips transferred its controller line, including the automation systems, to Grundig electronics. Since then, the Fuerth-based conglomerate, headed by Hubert Baren of the Netherlands, has been producing controllers for market niches and "thick-headed" buyers at four different sites. The sites and controller models are as follows:

- Fuerth: approximately 1,200 (1992) Grundig controllers, primarily the Dialog 11 for Deckel AG, but also the CNC 9000. The Dialog 11 is marketed as a Grundig controller.
- Eindhoven, The Netherlands: approximately 1,500 CNC controllers of various models (432, 532, CNC 5000) marketed under the Philips trademark.
- Brugg, Switzerland: approximately 300 controllers in varying configuration levels produced annually at the Grundig subsidiary Atek. These CNC specialists concentrated exclusively on high-speed processing and tool and mold manufacturing.
- Hannover: approximately 500 controllers reported to have been produced annually by Gildemeister Automation using the MPST concept. Few machine tools other than those produced by Gildemeister itself are equipped with these controllers.

Neither separate controller architectures nor individual development, production, and administrative teams can be justified economically for a "game reserve" such as this. Hubert Baren, who has been commuting between Fuerth and Eindhoven since the Philips controller line

was incorporated into his area of responsibility, understands this. "We must come up with entirely new approaches to production and organization." And because these changes are long overdue for more firms than just Grundig, Philips, Atek, and Gildemeister, Baren would like to come up with an "industry-wide solution" at the same time.

There is no doubt that a reorganization of the European controller market is desperately needed. In this recession, not one of the manufacturers—neither Siemens, Telemecanique (Num), Bosch, Heidenhain nor any others—is making the money that it needs to be able to stand up to the Japanese (Fanuc, Mitsubishi), who are the leaders in the field of control engineering. Consequently, it seems reasonable to apply the treatment to the entire European industry.

Never has there been a more opportune time. As predicted by the "pressure" theory, the last pockets of resistance are falling. Machine tool manufacturers can no longer afford their own controller architecture, at least when they stop kidding themselves and begin to take into account the actual cost of their CNC "luxury." After all, cost pressure has prompted the customers of the machine tool industry to rethink things as well. They are no longer willing to pay exorbitant prices for products that, because of their high cost and extremely demanding technology, have long been relegated to certain niches on the world market. The industry has had to abandon, probably forever, the notion of counting on a unique controller architecture to hold existing customers or woo new ones away from Japanese or Korean machine tool manufacturers.

It is, perhaps, the manufacturers of controllers who have suffered the most from the stubbornness prevalent among the European, particularly the German, machine tool manufacturers. The machine builders have repeatedly been able to play the electronic firms off one another. Should the threat of a switch to the competition prove insufficient, they have always been able to count on the introduction of a machine tool "made in Germany" but equipped with a Japanese controller to make the domestic controller manufacturers toe the line. This occurred both at the Paris Machine Tool Exhibition (EMO) in 1991, and at the Hannover EMO in 1989.

The target of the greatest amount of criticism has been the undisputed leader among European controller manufacturers: Siemens Automation Systems in Nuremberg-Moorenbrunn. The management of this key Siemens business line committed several blunders: premature advertisement of new products not yet market-ready, breach of warranty, and "overengineering." Pierer, the new head of Siemens, accused his executives of these same failings. At any rate, approximately 600 developers were forced to try to make it up to the German machine tool industry. To no avail, apparently. Even when the automation systems engineers developed universally compatible controllers with unusually large functional

scopes—fantastically large in comparison with the Japanese competition—such as the Sinumerik 880, there was inevitably one machine tool manufacturer who wanted to use the Siemens products only in a special configuration and with its own software. The ultra-modern production plants in Erlangen cannot be operated to their fullest capacity under such special conditions, however. This unique form of "partnership" came to an end temporarily when the bottom dropped out of the domestic machine tool market in late 1991; machine builders and electronic firms were left sitting on their merchandise.

If Hubert Baren of Grundig Electronics has his way, Siemens may be able to get rid of its excess units despite the recession. Baren is not optimistic about the future of electronics manufacturing in Germany, and he has no illusions about the situation in which his CNC conglomerate finds itself: "Grundig Electronics has no future as a manufacturer of CNC hardware. We may well have a future as a reliable supplier of CNC systems, however."

The subtle difference between the two lines in production. Baren views Siemens as a possible partner for his conglomerate, and consequently as the solution to his most pressing problem: the integration of different products and architectures. He would like to have a reliable partner manufacture not only individual controller components such as fiat modules, but the entire hardware system, in accordance with the guidelines and plans of his developers in Fuerth, Eindhoven, Hannover, or Switzerland. "We envision ourselves as a systems house, able to offer excellent individualized controller software for a wide range of applications. We neither can be nor want to be manufacturers of variety of different hardware components for controllers, however."

Such teamwork between the two neighbors could greatly benefit all concerned. There is no question that the Grundig developers proved, with the software for the dialog controllers for the Munich-based firm Deckel, that they can write modern, powerful CNC software and "package it" in an individual operating and display mode. With its controlling interest in Atek, Grundig has the necessary know-how to be able to use the correct control technology to adapt future developments such as sophisticated high-speed processing for their customers in the machine tool industry. The machine tool industry would also benefit from such an association for development and production, as it would become possible to purchase standard, and therefore cheaper, components such as flat modules, central processing units, monitors and control desks without sacrificing the all-important individuality of the display picture, performance characteristics, or operating philosophy. In regard to software, standard modules such as a newer and faster NC kernel or freely configurable operating surfaces would also be available. Furthermore, new technical developments would become available more rapidly, as the principle of shared labor would lead to shorter development times. The association would also benefit Siemens. The Siemens developers in Erlangen are already working

to full capacity to simplify the hardware enough to enable the company to compete with Japanese manufacturers in terms of cost. For although its manufacturing plants are among the most modern in the world, the German multinational is unable to manufacture its products economically. When the lot sizes are too small or the variety of models and product generations too wide, the work must—often purely as a result of deadlines—be diverted from the more economical “normal” assembly line to the “high-speed” (highest percentage of manual labor) assembly line in Erlangen.

Until they have solved all their development and manufacturing problems, Siemens engineers will have no time to spare for the exacting demands of their customers in terms of software. At one point in the past, a lack of software for the 850 and 880 models led to a temporary rift between Siemens and the machine tool manufacturers.

Although the proposition by Baren to solve the problems of an entire industry by reorganizing the Grundig line is a sensible one, it is unlikely to be implemented in the near future. The tangle of interests between the parties involved is too complicated. For example, it is still unclear as to whether the competitors Maho, Deckel, Gildemeister and Traub can be convinced to withdraw their resistance to the notion of using a common supply source. And assuming that a “German controller capable of holding its own on the world market” can be developed, what will become of the products already on the market, especially of their hardware? Only if the “pressure” philosophy is still valid after the 1993 EMO in Hannover will the time be ripe for the reorganization of the CNC market. Until then, Hubert Baren is on shaky ground. Should the establishment of the foundation for such a reorganization proved too time-consuming and difficult, the ultimate solution may be radically different. Hubert Baren comments: “The second largest manufacturer of controllers in the Far East is very interested in establishing a stronger foothold in the European market. We are talking with them as well.” The second largest Asian controller manufacturer, Mitsubishi, as the “anchor” of a “German” controller? Such a solution is unlikely to be in the best interests of the German machine tool industry.

[Box]

CNC Controllers: A Key Technology in International Competition

This February, a group of experts met at the Baden Wuerttemberg Ministry of Commerce in Stuttgart. Under the leadership of Dieter Spoeri, economics minister for Baden Wuerttemberg, Karl Grund (Hewlett Packard), Rainer Hahn (Bosch), Dieter Hundt (VMI), Wolfgang Kelch (VDMA), Peter Kistner (Chamber of Commerce), Berthold Leibinger (Trumpf), Walter Riester (IG Metall), Michael Rogowski (Voith), Klaus-Dieter Voehringer (Mercedes Benz) and others discussed “Joint Initiatives of Industry and Politics: Machine

Building.” At the heart of the discussion were concrete measures for improving the structure of the machine building industry in Baden Wuerttemberg.

The analysis of the then-existing problems focussed exclusively on the role of control technology within the international market. Under the caption “Technological Problems,” the minutes of the meeting read as follows: “One of the most critical issues is control engineering, which is essential to the survival of the machine tool building industry. The world market is presently dominated by a single Japanese manufacturer (Farnuc, ed.) If the German machine tool industry does not succeed in working together with German buyers and producers of control engineering components to develop a controller that can hold its own on the world market, an increasing number of German machines will be equipped with Japanese controllers. As a result, the majority of the know-how will shift to Japanese firms.”

The experts did more than merely make statements, they also agreed upon concrete solutions. Within the framework of a structural aid package of 235 million German marks [DM] for 1993 (1992: DM160 million), cash supplies could be used for the development of a “widely accepted European controller.” The development of such a controller was judged by the participants to be “a matter of important economic strategy.” The Ministry of Commerce is prepared to support cooperative efforts dedicated to this end by offering incentives. Baden Wuerttemberg-based firms that form strategic alliances can also apply for aid.

[Box]

Profit Through Reorganization

Although the Grundig AG “electronics” line had an excellent reputation within the firm technologically prior to mid-1992, it had, with a turnover of just barely over DM100 million, little effect on the firm's financial statement.

This is expected to change within the near future. The new—leaner—organizational structure will combine, under the Grundig electronics line, all Fuerth-based activities that do not fall under the entertainment electronics line. As of 1 January 1993, this has included six “business units”: office electronics, video and security technology, controller technology, measuring technology, and mobile radio telephone service and technology.

The line employs approximately 1,900 personnel, and is expected to report a sales volume of DM400 million during the coming fiscal year (1 April 1993 through March 1994). Almost one-quarter of this will be generated by CNC engineering and software.

Herman Troost, the new head of the Grundig electronics line, had his first chance to introduce the new organizational structure to the public at the Hannover CeBIT

(World Center of Business and Information Technology). Troost made the following statement: "Within the framework of economic development, Grundig must also adapt its corporate strategy to the world market. Consequently we are expanding and strengthening the Grundig electronics line, thereby establishing a strong foothold in professional electronics. Our objective is for each business unit to become one of the leaders of its field, both in and out of Germany."

Troost hopes to succeed by addressing the needs and problems of the user and offering custom-made solutions to these problems. That, in his opinion, is one of the strengths of Grundig electronics.

[Box]

Sercos: The End of an Ambitious Project

Six years ago, controller manufacturers, machine builders, and professors joined together to create the "Association of Sercos Interface Sponsors." The objective was the development of a digital interface that would make it possible to freely combine driving mechanism components and controller components produced by different manufacturers. One of the most important sponsors of this project was the Siemens automation systems line in the Nuremberg suburb of Moorenbrunn.

The association has now lost its most important mentor. Citing "a lack of technical prospects, cost disadvantages for customers in the machine tool building industry, and excessive innovation periods," Siemens has withdrawn from the association. As a full-range supplier of controller and driving mechanism technology, Europe's largest electronics concern believes that it can provide its machine tool customers with a high-performance, low-cost overall system with a digital drive and NC controller more rapidly by developing it independently. Once again the Germans have failed to carry through with a project that is far too ambitious technically. The machine tool manufacturers would have been the primary beneficiaries of the success of the project, at least theoretically. It would have enabled them to adopt a more flexible purchasing policy and choose from the products of a wider range of component suppliers.

Nonetheless, the transition from the traditional analog world to the new digital world will not result in lower costs; on the contrary, it will significantly increase the price of some driving mechanisms and controllers. Even if Siemens states that it is only "suspending" and "deferring" the Sercos development, without the active participation of its most important supporter, this project is doomed.

[Box]

Stubbornness Will Get Us Nowhere

Hubert Baren, a certified engineer, has been the head of the business unit "control technology" of the Grundig electronics line since September 1992. Before that, he

held an important position in the Philips automation systems line in Eindhoven. Under his guidance, Grundig electronics has expanded remarkably. In January, the corporation took over the CNC line from Philips, and less than a month later, Grundig electronics, which made just under DM160 million in 1992, purchased a majority holding of Gildemeister Automation in Hannover.

Christian Krause, a certified engineer, is now chief of controller sales for Grundig electronics. Before the reorganization, he was responsible for the sale of the 9000 model controller and the Dialog 11 controllers that Grundig produces for Deckel AG in Munich.

[MASCHINE UND WERKZEUG] How do you expect to be able to produce four entirely different product lines economically?

[Baren] We will have to ignore, for the time being, the products of our subsidiary firm Atek in Brugg, Switzerland—they are niche products. The product array in Eindhoven (Philips), Hannover (Gildemeister Automation), and Fuerth can be combined. Nonetheless, these products range from "small" to "large." In the future we will concentrate on the mid-range products and on one product line.

[MASCHINE UND WERKZEUG] What does that mean in concrete terms; are there inherent divisions within the product array?

[Baren] For reasons of price performance, there will be only one hardware. We have told our customers this as well, and are presently talking with the various partners. What was once a purely technical process has become an economic one, and consequently, a psychological one. We look upon it as a challenge to make the need for these measures clear to our customers.

[MASCHINE UND WERKZEUG] There have been many attempts to induce the machine tool manufacturers to adopt a single controller architecture; all have failed. Are you encountering skepticism this time as well?

[Baren] Of course! In the past, this would have been impossible. But it has been demonstrated that the stubbornness exhibited by some machine tool boards of management's must end. In the meantime, many people are thinking more realistically. If we want to be successful, we have to limit ourselves to what is possible here and now.

[MASCHINE UND WERKZEUG] What do you consider possible here and now?

[Baren] We are talking with the most important firms of the machine tool industry—approximately 20 out of approximately 350—as well as with our customers. We are working things out, step by step: Which servomotors should be used, which controller architecture and operator surfaces are desired, and what we will have to offer. Operator surfaces are naturally a problem.

In other words, first we are searching for the common denominators, then we will look at the applications. By having as many common denominators in the controller architectures as possible, we will be able to retain the individuality of the applications.

[MASCHINE UND WERKZEUG] How will this common hardware look, and how will you establish it as a "standard"?

[Baren] We are considering two fundamentally different approaches. The first approach would be to manufacture a closed system in large quantities, with the same hardware for everyone. Needless to say, this hardware would be of the highest quality and reliability. The second option—the preferred one—would be to produce a standardized hardware "core." This would include all components and functions not central to the individuality of the controller. Technologically, this core would look different than the current controller cores.

[MASCHINE UND WERKZEUG] You do not think that tailor-made, economically produced, "mass-produced" hardware is a contradiction in terms?

[Baren] No, it is possible. But that raises the next question: At what price? You can, of course, make everything out of the best hardware, but then it is too expensive.

There is one supplier, however, who does things differently, and we are focusing on that particular firm. It is not located in Erlangen, however. Nevertheless, we are still interested in working with our neighbors. We are not far enough along to be able to cooperate with one another, however, so we would have to have something along the lines of equal rights, and a market situation which, while it would not deprive the Erlangen firms of power, would still induce them to take cooperation seriously.

[MASCHINE UND WERKZEUG] Is the time ripe for that?

[Baren] If you had asked me that in December of last year, I would have said "Impossible!" Now I am seeing unexpectedly flexible approaches.

[MASCHINE UND WERKZEUG] Assuming that you form a cooperative effort with someone—irrespective of with whom. How much time will you need to ready the new controller architectures for market?

[Baren] I would love to have my product managers and developers give me an answer to that particular question. I have in mind the following timeline, though. By EMO 93 we will have done nothing more than continued the development of our four product lines. But by EMO 95 we must have a new—complete—architecture.

[MASCHINE UND WERKZEUG] Actually, this architecture—if it is to be ready for market by 1995—

should already be under development. Or do you think you will be able to slash the development period as drastically as that?

[Baren] In the past, each controller manufacture was continually developing new controllers. This led to situations wherein the expected development period was drastically exceeded, and the products were not available in time. This situation is intolerable, and the only option is to change our approach. No one can afford to start from scratch every time. We can reduce the development periods by separating the core that can be developed in an evolutionary manner from that which the market demands in functional special features.

Alcatel Strengthens UK Operations

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TELECOMMUNICATIONS INTELLIGENCE
in English 9 Aug 93 p 3

[Text] Alcatel NV recently consolidated its position in the UK with the amalgamation of its subsidiaries Alcatel Network Systems UK and Telettra UK.

The combined business will operate under the Alcatel Network Systems name with offices in London and Banbury, and a Customer Service and Support Centre in Warrington.

John Baker, BT's Sales Manager for leading business customers in Europe, has been appointed managing director of the new Alcatel Network Systems business.

Telettra UK was formerly part of the Italian telecommunications group Telettra SpA, which was acquired by Alcatel NV in 1991 to form Alcatel Italia SpA. Alcatel Network Systems UK was established in 1991 to develop sales of Alcatel's range of narrowband, broadband, and mobile network systems.

Alcatel Group operations in the UK also include Alcatel Business Systems which provides telecommunications products and systems for corporate networks and cable supplier, Alcatel Cablenet. The Group's UK telecommunications business has a turnover in excess of 100 million pounds and employs over 1,000 staff.

The amalgamation announcement follows Alcatel Alsthom's agreement with Northern Telecom to acquire STC Submarine Systems, its UK-based undersea cables division.

Smart Technology To Improve Competitiveness

BR2009085793 Rijswijk POLYTECHNISCH
TIJDSCHRIFT ELEKTRONICA/
ELEKTROTECHNIEK in Dutch Aug 93 pp 4-5

[Article by Eng. W.F.K. van den Eijnde: "Smart Technology Must Save Europe"]

[Excerpt] How Europe, and in particular the Netherlands, will come out of the struggle which at this moment

is raging with full fury in the electronics market depends upon scientists and technologists. They must ensure innovative design which the market cannot do without. Intelligent cost saving production techniques will be decisive. Europe is investing heavily in manufacturing techniques, but unfortunately is not the only one to be doing so.

In the manufacture of integrated circuits, the silicon wafer receives a great deal of attention from the European collaborative group JESSI (Joint European Submicron Silicon Initiative). Its importance is shown by the "Flexible Automated Wafer Production" (FAW) project, which was begun by Telefunken this year. Some 30 German and French companies are cooperating in this project. The starting point is that relatively small series of semiconductor products sell well at a competitive price, which is important above all for the manufacture of ASIC's [application specific integrated circuits] (intelligence, stored in silicon), the use of which will grow explosively over the next 10 years.

Taking into consideration the fact that the market for standard IC's [integrated circuits] is stagnating, this project could be of great strategic value for Europe. In a later stage, follow-up projects in France and England will be carried out (structures of 0.5 to 0.25 micron using 150- to 200-mm wafers). The future will show whether this development heralds a turning point for Europe and whether this time we will succeed in stopping a march on the American/Japanese steamroller.

In connection with the lowering of costs for small series of ASIC's, it is interesting to know that J. Leenstra of the Technical University of Eindhoven wrote a thesis covering a number of problems related to the automation of the testing process for ASIC's that are produced in small batches. The Ph.D. student puts forward proposals for costs-efficient testing methods.

Billions in Manufacturing Technology

In fact Siemens is the only concern in this part of the world that is still fully involved in the chip race. It must, therefore, become the defender of Europe's honor, which is self-evident when you consider that, despite the 0.5 billion German mark [DM] loss suffered by its semiconductor group, it still appears prepared to throw itself into 256-MB DRAM [dynamic random access memory] chips together with IBM and Toshiba, and to contribute toward the extremely high costs for research and development of about \$1 billion. As a matter of fact, "must continue" is a more appropriate expression in this context, because too much has already been invested: some DM3 billion since 1984. In the world of semiconductors, slogans such as "lemming behavior" and "bottomless pits" can still be heard. Siemens itself feels that it has no choice. The company claims that these exercises are essential in order to control 2.5-micron technology [as published, probably 0.25-micron is meant], which is essential in HDTV [high-definition television] equipment, for instance. In future, it should be possible to

produce an affordable HDTV set which contains no more than eight chips. Now a similar product would need a minimum of 60.

Fastest Component Mounting Machine

Nor is Philips sitting still as far as the development of more cost-effective and better production methods is concerned. A specialist group exists just for this: Electronics Manufacturing Technology. Recently, this group broke records with its extremely high-speed "Fast Component Mounter" (FCM), which can cope with 60,000 components per hour. In the area of surface mounting of electronic components, the system is seen as a major improvement. The machine, which is to be introduced officially in Europe still this year, consists of 16 pick-and-place robots which are positioned above a printed circuit board transportation belt of fewer than three meters long. In this way, as many SMD's (surface mounted devices) can be placed per hour as would otherwise only have been possible using six conventional surface mounting machines which would need a space of 20 meters. Another advantage is that the equipment requires a lower investment and fewer operators. The FCM can be programmed off-line with a special, user-friendly software package. Using this, mount processes for one or more printed circuit boards can be programmed, and they can then be sent to different machines. Also of practical value is the fact that the software continually monitors the process and that it integrates an autodiagnosics program.

Center for Microelectronics Helps in Automated Design

For small- and medium-sized enterprises, it is important that the development of integrated circuits gets rid of its specialist image. Current design technologies allow the electronics engineer to design complex functions on his workstation and then produce them in the form of a module or a component. Complex technologies with high functionality are becoming more accessible, which has important consequences for the electronics developers. The work methodology is changing from interactive, physical experiments to simulation using computer models. The Center for Microelectronics [CME] is constantly emphasizing the importance of EDA (electronic design automation) and is recording the results of the "EDA Tools Inventory" project in a book of the same name. "Electronic Design Automation, Selection and Input" is aimed at technical management, electronics engineers in electronics development companies, and project leaders in companies which contract out their electronics work. It can be ordered by writing, enclosing payment of 35 Dutch guilders, to: CME Eindhoven, Post Box 128, 5600 AC Eindhoven, The Netherlands.

Telecommunications Modernization

One issue which Europe must continue to follow closely is the development of new telecommunications methods in which cordless telephones, in conjunction with various kinds of computer applications, will give rise to

whole range of innovative products. These have already appeared; Apple's PDA's or personal communicators, as they have been called by other manufacturers. [passage omitted].

In the meantime, Apple and Siemens are already collaborating in this area and it would not be surprising if Philips, too, already has the necessary irons in the fire.

Strategy of British Telecom Analyzed

BR1609083193 Maidenhead TELEFACTS in English
Aug 93 pp 16-21

[Article by Harry Carrel, Julie Miezieski, Kevin J. Sara, and Stewart Wittering based on a 1993 report compiled by Northern Business Information: "British Telecom: A Strategic Analysis"; The full report includes a detailed analysis of all of BT's divisions, joint ventures and subsidiary businesses. In addition, the database tracks BT's cash flow from 1987 to 1992 and forecasts the company's performance through 1996.]

[Text] Since Northern Business Information's previous report in 1991, BT (British Telecommunications plc) has worked hard at improving its image both at home and abroad. It has shed all vestiges of the monopolistic past and daily reinforces the new image of an efficient commercial enterprise. It is responding well to the challenges and changes which confront it, wherever regulatory and market restrictions allow it to do so. BT remains the model by which many European and other telecommunications operators judge themselves.

BT continues to reinforce and expand its overseas activities in the three areas it has selected as most likely to prove successful sales arenas for its services and products: Europe, North America, and what BT defines as Asia-Pacific. It now has a clear overseas and international policy of complementing rather than competing with overseas domestic telecommunications operators, while taking advantage of its extensive worldwide network, infrastructure, and expertise to capture a large share of the global communications market.

As the largest player by far in the UK, BT continues to dominate telecommunications there. The company has continued its policy of honing down its activities to those

which support its principal business: national and international telephony; data and visual networks; the provision of access to these via the local network and interconnects; and personal and mobile communications.

BT has consolidated its 1991 reorganization and is using its new structure to great effect. It has worked hard at reducing staffing levels. The number of employees continues to fall, but at a price. BT now has a serious morale problem and some line managers are reported to be finding it difficult to maintain service levels. However, the reduction in numbers has provided BT's management with an opportunity to enforce its will, leaving labor unions and employees alike little choice in proposed radical changes in working patterns. Competition in the local loop is beginning to bite as CATV [cable TV] operators and mobile radio operators become increasingly active. Furthermore, BT faces the imminent prospect of even more competition for main network business.

Portfolio Analysis

Table 1 shows the sales of its various business units from 1987 through 1992. Despite government-imposed price restraints, BT remains extremely profitable and still enjoys the confidence of investors, large and small. Responding in part to calls for greater efficiency and in part to calls for U.S.-like labor/revenue ratios, BT has made colossal reductions in staffing levels since 1990 and has plans to continue doing so until 1995.

Payroll costs remain around 26 percent of revenues for the fourth year running, but will steadily decrease over the next four years as BT reaps the benefits of shedding personnel. With the main trunk network now fully digitized and large quantities of fiber being laid in the London local network, BT should be in a position to leverage its networking assets as its client base continues to grow. The only gray areas on the BT financial horizon are the increase in competition from local and national rivals, and the concern being expressed by some staff associations, though not by BT, regarding the cost of funding a pension scheme that now has the burden of supporting the tens of thousands who are drawing pensions prematurely. Table 2 shows selected operating statistics for 1987 through 1992.

Table 1. BT's Sales by Type of Service, 1987-1992 (millions of pounds)

	1987	1988	1989	1990	1991	1992	89-92 CAGR
INLAND SERVICES							
Public telephone services: exchange line rentals							
Business	438	482	530	583	682	762	12.9%
Residential	856	924	949	1,054	1,212	1,355	12.6%
Public telephone services: customer calls							
Customer calls	3,674	3,960	4,397	4,864	5,151	5,171	5.6%
Apparatus							
Apparatus	1,164	1,189	1,177	1,171	1,349	1,251	2.1%

Table 1. BT's Sales by Type of Service, 1987-1992 (millions of pounds) (Continued)

	1987	1988	1989	1990	1991	1992	89-92 CAGR
Other Network Income							
Public call boxes	145	150	159	164	147	146	-2.8%
Private circuits, telex and misc.	947	1,132	1,270	1,373	1,325	1,318	1.2%
TOTAL INLAND SERVICES	7,224	7,837	8,482	9,209	9,866	10,003	5.7%
INTERNATIONAL SERVICES							
International and overseas services	1,246	1,400	1,548	1,790	1,812	1,793	5.0%
Overseas activities	448	451	501	591	530	577	4.8%
British Telecom enterprises	429	594					
International Products Division	439	458					
Overseas division	55	60					
Communications systems							
Mobile communications			327	400	520	679	27.6%
Yellow pages			180	200	218	238	9.8%
Software, Fac. Mgt., Packet Nets			493	518	555	570	5.0%
Mitel			245	263	285	90	-28.4%
Intra-group	(511)	(615)	(705)	(656)	(632)	(613)	-4.6%
TOTAL REVENUES	9,330	10,185	11,071	12,315	13,154	13,337	6.4%

Source: Northern Business Information

Table 2. Selected Operating Statistics, 1987-1991

	1987	1988	1989	1990	1991	1992
Number of exchange connections						
Business ('000)	4,364	4,558	5,037	5,551	5,795	5,866
% growth over prior year		8.1%	10.5%	10.2%	4.4%	1.2%
Residential ('000)	17,569	18,145	18,703	19,246	19,573	19,729
% growth over prior year		3.4%	3.1%	2.9%	1.7%	0.8%
Number of exchange connections served by digital or electronic switches ('000)	9,212	11,760	15,051	18,920	21,309	22,933
% of total exchange connections	42.0%	51.8	63.4%	76.3%	84.0%	89.6%
% Call growth over prior year						
Domestic	7%	8%	11%	10%	4%	1%
International	11%	14%	13%	13%	6%	4%
Number of public call boxes ('000)	78	81	86	90		
Telex exchange connections ('000)	111.5	116.2	111.1	99.8		
% growth over prior year	6.9%	4.2%	-4.4%	-10.2%		
Mobile phone subscribers ('000)	65	130	258	429	509	547
% growth over prior year		100.0%	98.5%	66.3%	18.6%	7.5%
British Telecom employees						
BT UK	199,841	204,522	210,125	208,947	221,100	204,300
BT International	12,002	11,573	11,691	13,473	5,800	6,200
Communication Systems Division	12,711	14,733	15,750	17,208	NA	NA
R&D and Corporate Staff	9,843	6,377	6,852	6,037	NA	NA
Total number of employees	234,397	237,205	244,418	245,665	226,900	210,500

Source: Northern Business Information

Functional Analysis

Since our 1991 report, there have been a few personnel changes near the top for various reasons, and nothing much should be read into them. Many of the familiar but unspectacular executives remaining at the local level, their positions once ensured by incumbency, patronage, and fraternal ties, are now having to justify their fixed-term contracts in terms of quantifiable performance.

Business Communications Division (BC)

Although BC caters for less than one-quarter (about 6 million) of BT's 26 million customer lines, it earns one-third of BT's profits. Having reduced its product portfolio to a minimum, BC is now leaner and more focused than ever. However, while reducing its offerings at home, BC is expanding its international and overseas portfolio considerably. Services such as Syncordia, offering global outsourcing, and Cyclone, providing international virtual network services, have given BT the opportunity to jump several steps ahead of its American competitors.

Personal Communications Division (PC)

PC's 20 million strong residential client base accounts for three-quarters of BT's exchange lines, but provides less than two-thirds of BT's profits. Despite potentially serious challenges from rival local loop operators using CATV or radio local-loop networks, and from changes in customer loyalties, PC still manages to cling to 99 percent of its former customer base. Changes under consideration at the moment may lead to PC's arena of activity being extended to include single-line businesses.

The extended use of subcontractors and the shedding of some activities have allowed PC to reduce drastically the number of technicians on the payroll. Proposed changes in working patterns to provide seven-day, double-shift coverage will allow PC to maximize use of its workforce at no additional cost. Coupled with these changes, the extension of garaging company vehicles at home will allow PC to reduce central garaging depots and early morning signing-on centers. PC is investing heavily in revamped retail outlets with prominent locations as part of an effort to improve its image.

Special Businesses Division (SB)

Cellnet, BT's cellular offering in partnership with Securicor, has about 45 percent of the UK market. It remains highly profitable, with a \$151-million operating profit for FY 1992. Plans are in the pipeline for the introduction of value-added services, such as its much-touted Callback service. SB's mobile communications product portfolio has been reduced and updated to allow it to compete more effectively.

Operator services have been computerized and relocated to less expensive locations. Automation has allowed a reduction of almost 80 percent in staffing levels; employees were either redeployed within the company or

accepted voluntary release terms. Service has improved measurably within operator services. The directory assistance service has been converted from a free service that was much abused by commercial concerns seeking details on lists of people to a sound revenue-earned by the introduction of call charges. Yellow Pages continues to earn significant profits and has expanded its range of services to provide an operator assistance service at local call rates, online searches, also at local call rates, and directory information on CD-ROM. In addition, BT has entered the videophone market with a terminal costing less than \$750.

Worldwide Network Division (WN)

WN's main network is now totally digital, a notable worldwide first for BT, as are all of the main trunk network switching centers. Network performance has improved noticeably to provide a 99.5-percent chance of any call getting through at first attempt, with almost zero call set-up delay. Almost 2 million km of fiber cable have been laid in the main network; over 0.25 million km in the mostly digital local junction network. Private circuit numbers have increased as the range of services has been extended. Competition in the main network is on the horizon as public utilities and North American companies declare their intention of entering the market. Internationally, BT has extended its direct dialing to over 200 countries and states, and continues to invest heavily in maritime fiber-optic cable schemes. On the global front, BT has complemented its Global Network Services network, based on the former Tymnet, with the Syncordia network, and proposes to extend it even further with a new 8 Mb/s private network (currently known as Cyclone) capable of international virtual network services.

Regulatory Environment

In 1991, Her Majesty's Government further liberalized the UK telecommunications industry by publishing a Green Paper called the "Duopoly Review," whose contents, after a period of review, were incorporated in a White Paper entitled "Competition and Choice: Telecommunications Policy for the 1990s." Government action effectively ended the duopoly enjoyed by BT and Mercury, opening the market to numerous rival contenders in both the local loop and trunk network. These changes were quite profound and exposed BT to increased competition in the local loop. The success of the early contenders has encouraged others. While not as far-reaching, changes in regulation have followed, principally in the area of price-capping. Additional changes are being proposed, with the EC looking to involve itself more in telecommunications matters.

Portfolio Analysis

BT's vision of the future includes a primary role in international business life as a network provided offering worldwide communications facilities. Its portfolio of companies and its acquisition policy can be seen to

reflect this clearly defined role; the shedding of Mitel and of BT's UK manufacturing concerns are examples of BT's current vision of itself.

On the domestic front, BT continues to divest non-core businesses to concentrate more and more on the main network. During April, 1992, BT sold off IAL (International Aeradio Limited), an airport and telecommunications services provider. This was followed in May, 1992, by the divestiture of Sharelink Limited, a telephone-based securities trading services provider. In March, 1993, BT sold its 90-percent holding in the alarm services provider Telecom Security Ltd. to Automated Security Holdings.

A lot of installation and routine maintenance work beyond the main distribution frames (i.e., in the subscriber loop) is now being subcontracted out after the manner of North American companies. We may well see BT divest itself of further responsibilities by sectionalizing and hiving off some of its less profitable local network activities.

Globalization

One of the first steps towards globalization was the acquisition of Tymnet, the U.S. data network operator, in 1989. This provided BT with a solid foundation on which to build its global managed data network services. BT Global Network Services (GNS), as it is now known, boasts a 26-percent share of the global data market, including a 38-percent share of the U.S. market. With service extended to more than 100 cities worldwide, GNS business is expanding at more than 15 percent per annum. The acquisition of Tymnet's empire also gave BT the opportunity to take advantage of the European data market, which was liberalized in 1991. BT has entered into an agreement with Olivetti whereby Olivetti will provide maintenance support for BT's European customers.

In support of its globalization aims BT created, in 1991, a telecommunications management outsourcing company called Syncordia, based in Atlanta, Georgia. It was destined originally to be a wideband data, image, and voice carrier over a private international network that provided end-to-end management. Thereafter, it was spilled into a management link and a data link, and eventually was revamped into a global outsourcing company.

BT is currently establishing a third global service, to be called Cyclone, which will offer International Virtual Network services (IVN). Costing \$800 million, it will lend top-level support to BT's dreams of becoming a global supercarrier. Cyclone is to form part of a three-tier portfolio, with baseband/value-added GNS and Syncordia relegated to the lower tiers. It will be based on 20 strategically placed superswitches. BT hopes to have London, Frankfurt, Sydney, and New York up and running during 1993, and the whole network completed by 2002. This would put BT well ahead of rivals AT&T, Sprint, and NTT [Nippon Telephone and Telegraph]. It

would give BT the opportunity to undercut everyone else's international traffic tariffs by perhaps as much as 10 percent, thus ensuring a large capture of market share.

BT is said to be interested in buying part of MCI. An outright acquisition of a major U.S. carrier would fit well into BT's global plans, but would require approval at the highest levels of government. (Editor's note: BT's interest in buying part of MCI was fulfilled in June 1993 when the two companies announced that BT will take a 20-percent stake in MCI at a cost of around \$4.3 billion.)

In March, 1993, BT applied to the FCC for an international simple resale (ISR) license. Such a license would permit BT to offer international switched services directly to U.S. customers, enabling BT to become a player in the U.S. market for international services. The FCC will probably grant such a license as soon as the major U.S. carriers receive similar licenses in the UK. When the U.S.-UK ISR market opens up, a battle of the giants will have begun. We expect BT, AT&T, MCI, and Sprint, with their respective partners, to compete fiercely in all deregulated markets around the globe. The initial battleground will be in the most liberal markets: the UK, Sweden, Australia, Canada, and the United States.

Mobile Services

BT remains active in the UK cellular market through its 60-percent holding in Telecom Securicor Cellular Radio Ltd., which operates the Cellnet network. The network covers 98 percent of the UK population and the size of its client base remains huge, at about 500,000 customers. Cellnet's emphasis, BT claims, is on providing high-quality, market-driven services such as Callback, a messaging service that takes messages even when the cellular phone is switched off, relaying them later. Since 1991, Cellnet has been heavily involved in helping develop the new pan-European cellular network.

BT has never been allowed to dominate the mobile phone market. A second operator, Vodafone, was licensed, and it now has slightly more customers than Cellnet. The government does not allow Cellnet to sell its products directly to users. These are marketed by BT Cellular Services and other companies. The government, in line with its policy of allowing and encouraging competition wherever possible, has not allowed BT to compete in the Band III radio market, aimed at taxis and delivery vehicles. In addition to its existing involvement in voice telephony, personal paging, and voice messaging, BT's options for the future include mobile data and satellite paging/data systems.

BT wound down its Phonepoint telepoint service in late 1991 before withdrawing completely in 1992. In common with the other licensed operators, BT blamed too much competition, a lack of standardization, and untimely marketing. None of the other three original licensed operators is still operating a phonepoint service. The UK now has only one telepoint provider, Hutchison Rabbit.

In November, 1992, BT announced its intention to sell its 20-percent holding, 35.8 million shares, in McCaw Cellular Communications to AT&T at a price of \$49 per share. The price is set to rise at a rate of 4.5-percent per annum from December, 1992, until closing or until 30 September 1993, whichever is the earlier. Assuming a close in June 1993, the effective price would be around \$50. This compares favorably with the 1989 purchase price of approximately \$41. Exuberant about the sale, BT claims it represents an ideal opportunity for BT to realize shareholder value from its investment. This might suggest that Iain Vallance's claim that the company's holding in McCaw Cellular was of long-term strategic importance rather than a straight investment, lacked a little honesty. On the other hand, it may be that BT has rationalized its long-term plans for North America and believes that they can be fulfilled using Tymnet, Syncordia, and BT Inc. BT will realize about \$1.8 billion from the sale.

Cable TV

BT has now stripped itself of all its CATV operations with the exception of Westminster Cable, which currently serves 13,800 customers. Following a period of low funding, possibly pending the shedding of its interest, BT is now understood to be looking to raise the level of its investment. BT also provides the networks for five narrowband cable networks known as the New Towns System, which are operated by other companies. BT is still active on the R&D front, conducting field trials of integrated delivery systems in Bishops Cleeve.

Cable TV per se is currently enjoying moderate success despite competition from an expanding satellite TV service and the cash-limiting effects of the deeply entrenched recession. However, many CATV operators are now offering or considering offering telephony services to existing domestic and business clients. These are delivered via an overlay network or an integrated delivery system. The response has been phenomenal. Many companies report penetration rates of 30 percent or higher (of homes or businesses passed). As of March 1993, CATV companies claimed 130,000 lines nationwide. Over 1 million customers, many of them business customers defecting from BT, are expected to sign up for cable telephony services before the end of the decade. BT is rightly worried about this and launched a so-called "Winback Campaign". Initially, it met with very little success, but of late BT has regained about \$75 million worth of business. Although BT has more than 26 million customer lines at the moment, the loss due to CATV operators will be very pronounced in some sectors. Most London cable TV operators expect that the television side of their business will be conducted as a sideline within two years.

Following the Duopoly Review, BT was debarred from offering CATV services on a national basis until 1998 at the earliest. This it finds particularly galling as it sees U.S.-backed concerns of similar or greater size taking over the market with offerings of both telephony and television services. BT could, however, have bid for individual

franchises, the same as other operators, but chose not to do so. Had BT been allowed to stay in the market, it would have effectively blocked the progress of CATV companies offering rival telephony services. BT must wait until 1998 to see what, if anything, is left of the market.

Telecom Equipment

BT has decided that it will shed those subsidiary concerns whose services it can buy, and has consequently withdrawn completely from the manufacturing and refurbishing side of the business, disposing of its once large Factories Division, which had huge sites in Birmingham, London, and Cwmarn (South Wales).

BT does, however, hold a 25-percent stake in Fulcrum Communications Ltd., which produces highly technical equipment to BT specifications, such as multiplexers for SDH [Synchronous Digital Hierarchy] use. It also holds a 40 percent stake in BT&D Technologies Ltd., which produces opto-electronic devices developed by BT R&D at Martlesham.

BT sold its 51-percent stake in Mitel in June, 1992, to institutional investors. BT has been reviewing its interest in Mitel for 18 months prior to the sale. At the time of the sale, BT declared that it was no longer interested in manufacturing telecommunications equipment and that the sale of Mitel represented the end of its direct involvement in manufacturing.

DASA's Schrempp on Strategy, Cooperation, Conversion to Civilian Strategy

93WS0684A Munich TOP-BUSINESS
in German Sep 93 pp 42-49

[Article by Claus Westermeier and Peter Carl: "Wickerwork with System: DASA"]

[Text] *With more strategic external alliances, an internal lean-and-mean regimen, and by replacing military with civilian projects, DASA boss Juergen Schrempp has placed Germany's aviation and space company on a new launch pad. TOPBUSINESS magazine interviews DASA managers Juergen Schrempp and Manfred Bischoff on the future structure of DASA.*

Juergen E. Schrempp's successes are usually the result of hard work. Since Edzard Reuter, CEO of Daimler-Benz, thrust the Swabian dynamo into the position of chairman of the board of DASA (Deutscher Aerospace) in 1989 to form a world-class aviation and space company out of the then directionless MBB, MTU, Dornier, AEG Defense Technology, and, finally, Fokker companies, licensed pilot Schrempp has been dashing about the world. He has secured global cooperative ventures with giants like United Technologies' subsidiary Pratt & Whitney, General Electric, Aerospatiale, and Fiat. Currently, he is looking for a U.S. partner for MTU's diesel motor branch in Friedrichshafen, working on specific projects with Mitsubishi, investigating the possibilities of cooperating with the CIS countries, giving the final

polish to DASA's new organization, and eliminating unnecessary costs by means of a new "liquidity oriented control" program.

The fact that DASA has reached the number three position, behind Boeing and McDonnell Douglas, in the aviation and space industry, and that it pursues a broad spectrum of activities, is due in no small measure to Schrempp's tireless efforts. It is with pride that DASA's top man points out that since 1990 his company has advanced from a starting position to its current highly respected standing in the aviation and space industry.

Schrempp's most recent triumph is more a stroke of good fortune than the result of purposeful negotiations. Edmund Stoiber granted him the unexpected coup. Stoiber, the minister president of Bavaria, wants to sell the Free States's 8.25 percent of DASA whose parent company is Daimler-Benz. Schrempp will thereby be rid of his next to last governmental part owner; Hamburg still holds 5.99 percent. The sigh of relief over this "highly desirable" (Schrempp's words) development was highly audible. This agile businessman has had a problematical relationship with politicians in the past (see the following interview). The representatives of the people and the bureaucrats have repeatedly tried to tie the hands of this high flyer. In his fight over Fighter '90 with Defense Minister Volker Ruehe, in the dramatic cut-backs made by Research Ministers Heinz Riesenhuber, Matthias Wissmann, and Paul Krueger of monies for European space projects, and in the skirmishes with the former MBB powers in Bavaria, Bremen, and Hamburg, Schrempp had to learn the hard way how bitter a dependence on governmental agencies can be. This top German armaments manager has tried in vain for a year and a half to obtain reliable planning from Harthoehne, the seat of the German Ministry of Defense. But the DASA team in Ottobrunn, a suburb of Munich knows only that the defense budget will decrease from the 12 billion German marks [DM] available in 1990 to DM6 billion in 1994.

It is therefore no surprise that Schrempp is eyeing business undertakings in the civilian sector in the future: regional aircraft, satellites, engines, and diesel engines at the high-tech end.

DASA's CEO needs a significant breakthrough soon. By strategically shrewd positioning here and there, the Daimler Company, which has slipped into a difficult crisis, wants finally, after a four-year warming up period, to see some significant profits from its expensive subsidiary.

Schrempp's mentor, Reuter, will vacate his top position by the end of 1995 at the latest. In the interim, if Schrempp, who is the favorite to succeed Reuter, really wants to assume his legacy, needs to produce better DASA figures. The way is wide open. After a DM341 million loss in 1992, Schrempp has no illusions about the future. "1993 and 1994 will be two very tough years." Things will only improve, he believes, in 1995.

Above all, Schrempp hopes to achieve an optimal company situation through cooperative ventures.

TOPBUSINESS: Herr Schrempp, Herr Bischoff. After its purchase of Fokker and its pioneering cooperative ventures with medium-size aircraft engines, DASA now appears to have rounded out its organization. Is the rough final structure now in place, or do you have to make additional strategic acquisitions?

Schrempp: We believe that the various acquisitions, together with the joint and cooperative ventures in our strongest fields, have now made us strong enough to be able to proceed to converting our new strategic position into business successes. Besides some unavoidable measures still needed to reduce costs further and to improve efficiency, effective internationalization, i.e., better access to world markets for our individual products, is currently our top priority.

TOPBUSINESS: Are divestments also a possibility? Medical technology, inherited from Dornier, really does not quite fit into your portfolio.

Bischoff: It is always more pleasant to make acquisitions and enter into cooperative ventures than it is to divest components of our business. Still, we have already let go of much of what we had inherited that did not really belong to our main specialties. This process will be accelerated. It would certainly be better in the long term if most of the medical technology would be taken over by a partner, who specialized in that field.

TOPBUSINESS: You pulled off a coup recently in the cooperative venture with Snecma, General Electric, and Pratt & Whitney in the matter of small engines. You beat out your competitor BMW in that. Aside from Rolls-Royce, the Munich people now stand alone in that field.

Schrempp: We negotiated with BMW for a long time. However, during the talks different opinions and positions were expressed over shares and systems management. In addition, BMW was striving for a purely European solution. It paid off for us to think about alternatives concomitantly as the negotiations with BMW were going on.

TOPBUSINESS: Can Rolls-Royce still join up with the large alliance?

Schrempp: I don't see that happening.

TOPBUSINESS: In the company of the international engine manufacturers, MTU, DASA's subsidiary, is always the junior partner. Pratt & Whitney, for example, its most important partner, can show a turnover nine times as great as MTU's. Is not the smaller partner necessarily doomed to go under in such a constellation?

Schrempp: I am not concerned about that. We have often been criticized because we continue to talk with the Japanese. Everyone says that they will take us to the cleaners. In my opinion, whoever, in the final analysis, permits himself to be taken to the cleaners was simply

not competent enough to represent his positions and interests. What we have done in the last three years in this regard shows that we are completely confident—I say that without arrogance—that we can competently represent ourselves.

Bischoff: The fact that Boeing is working with us on a feasibility study for jumbo aircraft vividly attests to the standing DASA has achieved.

TOPBUSINESS: Is the fact that Bavaria is pulling out of DASA an advantage?

Schrempp: Definitely. We will then gain another degree of freedom, which will make things easier.

TOPBUSINESS: How are you doing in substituting civilian-oriented projects for military?

Schrempp: We have reduced the proportion of defense-oriented projects from about 50 percent in 1991 to 27 percent at the present time, which is near our goal of reducing the military to about one-fourth of the turnover.

TOPBUSINESS: But not just your business with missiles, radar, communications, and electronic information systems are dependent on the public trough, the space field too is chiefly funded by the government.

Schrempp: It is precisely for that reason that we are massively expanding the commercial aspects of satellites. Together with our European partners, we have bought into the U.S. Space Systems Loral Company (SSL).

TOPBUSINESS: Do you want to operate the satellites as well as develop, build, and equip them?

Schrempp: We are already doing that in South America and the CIS. We are now confronting the strategic question as to whether we, after getting into Global Star—a worldwide satellite-based communications system—ought to hazard the final step into the operator business.

TOPBUSINESS: DASA lost DM341 million last year. Germany is in the throws of a bad economic and structural situation. How is your company reacting internally to that?

Bischoff: We have done away with hierarchical levels, reduced the head office from 720 to 350 people. We are improving procedures and releasing 7,500 employees in one program in order to become leaner.

Schrempp: And it is just as important to instruct DASA workers on how to compete successfully in the face of tough international competition. That cannot be accomplished in a single day. We are in the process of introducing a new market- and result-oriented mentality. The workers themselves have made excellent proposals in this regard. The proposals will be polished up and converted into action in a "mobilization" program.

TOPBUSINESS: The magic formula for crisis management today is called "industrial policy." Does that help in the highly technological field in which DASA works?

Schrempp: First of all, it must be said that we are naturally in favor of private economic initiatives. However, the Federal Republic of Germany does not operate in isolation; the world as a whole must be considered. If President Clinton in the United States launches a \$20 billion program to promote high-tech and there is a new MITI paper on the long-term positioning of Japan in future technologies, we cannot just sit here on our hands and say that such things should not happen in Germany.

TOPBUSINESS: Liberals warn of a new subsidization race and more government controls.

Schrempp: I do too. Despite that, I have often been astonished at the statements of some professors. When we speak of industrial policy, we simply mean that economic policy should create the requisite conditions for the private economy to function competitively here in Germany with the cooperation of the unions.

TOPBUSINESS: What does that mean?

Schrempp: For one thing, it is a matter of cost structures, working hours, competitive conditions that match those the world over, etc., etc. But most importantly, it is a matter of creativity, innovative skills, and technology.

TOPBUSINESS: What sort of policy do you expect in the field of technology?

Schrempp: Here in Germany, 19th century technologies are kept alive with billions of German marks, while the technologies of the 21st century receive minimal support. The government has to finally decide on just what role Germany is to play in the future in microelectronics, microsystems technology, material research, genetic engineering, and aviation and space. We couldn't change anything if the politicians in the final analysis decide that aviation and space are not the right fields for Germany to be in. But we want to know definitely so that we can make plans and the necessary investment decisions. For that reason, we need to have to introduce a new quality in the dialogue between the economy and government policy.

Bischoff: We run the danger in Germany of losing the technologies that will define an industrial nation in the next century.

TOPBUSINESS: The squabbling over Fighter '90, the enormous cut-backs in the Hermes, Ariane, and Columbus space projects. Three ministers of science in short succession. Haven't you been burnt already?

Schrempp: We remain optimistic because the readiness of politicians of all parties to enter into an intensive dialogue has considerably increased in the past two years because of the acute situation.

TOPBUSINESS: Can specific results be pointed to already?

Schrempp: Unfortunately, we have not gotten that far. But we haven't capitulated and we continue to fight on for future-oriented goals and positions.

Widely Diversified DASA

Business	Activities	Cooperative Ventures	Partners	World Market Position	Main Competitor	Strategic Goal
(1) Aircraft	Airbus	37.9% in Airbus Industries	Aerospatiale, British Aerospace, Casa	No. 2	Boeing, McDonnell Douglas	Reducing costs
	military aircraft	33% in Eurofighter	British Aerospace, Alenia, Casa	no open market		Fighter 2000
	regional aircraft			No. 2	Boeing	integration by Fokker
	helicopters	40% in Eurocopter	Aerospatiale	No. 2	Sikorsky	additional partners
(2) Space	carrier systems	Hermes, Ariane	16 European countries	no market		maintain programs
	space stations and platforms	Eurocolumbus	Alenia, Matra	no market		expand European leading role
	satellites	12.25% in Space Systems Loral (SSL)	Aerospatiale, Alcatel, Alenia, SSL	No. 3 in the SSL grouping	Hughes Aircraft, General Electric	enter operator business
	satellites	European Satellite Industries (ESI) planned	Aerospatiale	No. 3 in the SSL grouping	Hughes Aircraft, General Electric	enter operator business
(3) Defense, Civilian Systems	guided missiles	50% of European Defense System (EDS) planned	Aerospatiale	because of export controls, mostly national and NATO	Thomson, Matra, British Aerospace, Alenia	substituting civilian for military activities
	radar and radio					substituting civilian for military activities
	electronic information systems					substituting civilian for military activities
	photovoltaics			no market-ready products		substituting civilian for military activities
(4) Propulsion Systems	engines	33% in Eurojet, cooperation with Pratt & Whitney	Rolls-Royce and Fiat, Pratt & Whitney	No. 5	General Electric, Rolls-Royce, Snecma	expansion of cooperative ventures
	engines	12.1% in International Aero Engines	Pratt & Whitney, Rolls-Royce, Fiat, Mitsubishi, Kawasaki and Ishikawajima	No. 5	General Electric, Rolls-Royce, Snecma	expansion of cooperative ventures
	engines	33% in Turbomeca "Vierertriebwerk"	Pratt & Whitney	No. 5	General Electric, Rolls-Royce, Snecma	expansion of cooperative ventures
	high-performance diesel engines	seeking U.S. partners		No. 1	Cummins, Caterpillar, Detroit Diesel	standard products

To summarize DASA in German mark figures, it has a total turnover of DM17,276 billion, a total of 81,872 employees, a cash-flow of DM1,309 billion, an R&D outlay of DM5,179 billion, and a last-year balance of -DM 341 million.

These figures are broken down further in the table given above. Thus,

(1) Aviation: 1992 turnover DM7.5 billion; employees 1992: 39,000; origins: MBB, Dornier; chairman of board Hartmut Mehdorn.

(2) Space: 1992 turnover DM1.9 billion; employees 1992: 4,800; origins: MBB, Dornier; chairman of board Werner Heinzmann.

- (3) Defense, Civilian Systems: 1992 turnover DM3.6 billion; employees 1992: 14,300; origins: MBB, Dornier, Telefunken Systems Technology; chairman of board Werner Heinzmann.
- (4) Propulsion Systems: 1992 turnover DM3.6 billion; employees 1992: 16,300; origins: MTU; chairman of board Hubert Dunkler.

Photo Captions

1. p. 42 (upper middle): The CEO of DASA, Juergen Schrempp (right) makes the jump to the top of the Daimler-Benz enterprise; financial chairman of the board Manfred Bischoff (left) will inherit him.
2. p. 44 (lower right): Schrempp: "It is regrettable that we Germans get gray hair just at the mention of the concept 'industrial policy.' That has to change."
3. p. 48 (upper right): Bischoff: "We are in the process of adapting our structures, of reducing the number of workers, and of improving our procedures."

EUROPE-ASIA RELATIONS

Danish Industry Contests US Trade Sanctions Against PRC

BR1409091393 Copenhagen DET FRI AKTUEL
in Danish 30 Aug 93 p 6

[Article by Jens Grund: "Exports to China in Danger—Employers' Organization 'Dansk Industri' Claims That New U.S. Trade Sanctions Against China Will Affect Danish High Technology Exports"]

[Text] Dansk Industri [Danish Industry] fears that Danish high technology exports to China are being threatened.

The new U.S. trade sanctions against China cannot avoid hitting Danish exports, and the embargo could cost many millions of Danish kroner in lost Danish orders, claims the employers' organization.

"We are a major exporter of telecommunications equipment to China and, in our experience, such an embargo will not only affect the United States," said Marianne Castenskiold, chief Dansk Industri consultant.

The United States has introduced sanctions against China and Pakistan, who the Americans blame for dealing in sensitive missile technology. China claims that the accusations are unfounded.

The U.S. embargo will last two years and affect sales of civil technology that can be used for military purposes and for space travel.

"A two-year embargo could paralyze our market. The United States can hit us in two ways," said Marianne Castenskiold, "and they will undoubtedly do so."

COCOM Slowed Down

First, the sanctions will affect Danish exports of sensitive technology, because sales will first have to be submitted to COCOM, said Dansk Industri.

COCOM is the West's watchdog for exports to Eastern Europe and other parts of the world, where it is feared that the products in question will be used for military purposes. All the COCOM member states, including the United States, have a veto right.

In addition, Danish technology will be affected by American components integrated in its systems and United States-controlled companies operating in Denmark—such as IBM and Digital, explains Dansk Industri.

"If the United States does not succeed in stopping other countries, like ourselves, it will shoot itself in the foot without seeing its sanctions take effect, for the gap left by U.S. sanctions would be filled in by others—e.g., European, Japanese, and Canadian industry."

The negative impact of the sanctions on the U.S. export revenues will amount to 3.5 billion Danish kroner per year. For Dansk Industri the embargo has come at an exceptionally inconvenient time, for there is currently a stream of enquiries from Danish firms that are seeking commercial access to the Chinese telecommunications market.

"They have great expectations regarding China, which is starting to open up its market," said Marianne Castenskiold, "and in the telecommunications sector there are extremely large orders at stake."

"The U.S. decision is so new that we do not yet know how hard Denmark will be hit. We must now feel our way. However, it would be catastrophic if the whole market is closed off. I cannot believe they would do such a thing."

Ericsson Establishes Joint Venture in PRC

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TELECOMMUNICATIONS INTELLIGENCE
in English 6 Sep 93 p 16

[Unattributed article: "China: New Joint Venture for Ericsson"]

[Text] Ericsson has signed an agreement with North East Communication Group Company in Liaoning province to establish a joint-venture company in the city of Dalian. The new company, to be called Dalian Ericsson Company Ltd, will have a total equity stock of \$5 million of which Ericsson will hold the majority.

Dalian Ericsson will start its activities in the field of engineering, assembly and technical support for AXE10 switching systems to be delivered to customers in the northern part of China. When the company is in full operation in 1995, it is expected to employ about 200 people.

In September, 1992, Ericsson signed a three-year general purchasing agreement with the Liaoning Province Post

and Telecommunications Administration under which it will supply AXE switching equipment worth \$116 million. As part of this agreement, Ericsson received a number of contracts earlier this year to mostly upgrade and extend existing AXE exchanges installed throughout the province.

Ericsson claims to presently have more than 1 million lines of AXE10 installed or on order in Liaoning province.

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